

COLLECTIVE ACTION AND PROPERTY RIGHTS FOR SUSTAINABLE DEVELOPMENT

Collective Action in Pest Management

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Every year, crop and animal pests deprive farmers of significant parts of their production. Some estimates suggest that 10–40 percent of the world's gross agricultural production is destroyed by agricultural pests. These pests include a huge variety of different organisms—not only insects, mites, worms, rodents, and birds, but also, in a broader sense, all harmful organisms such as fungi, bacteria, viruses and virus-like organisms, and weeds. The variety of pests and their interactions with other ecosystem conditions make pest problems very diverse and often complex, so solutions to single pest problems must vary substantially. Some pests can be controlled by individual farmers; others are amenable to public programs like aerial spraying. Many pest management approaches, however, call for neighbors to work together.

In the 1970s and 1980s the rapid spread of the cassava mealy bug in Sub-Saharan Africa cut into cassava production and nearly created a major famine in many areas. Researchers from the Consultative Group on International Agricultural Research (CGIAR) succeeded in identifying and mass breeding a natural predator of the cassava mealy bug—a parasitic wasp from Paraguay—that was released by airplane over the entire cassava-growing belt. By the early 1990s the wasps had spread to a point where a state of ecological balance between the cassava mealy bug and its predator had been created throughout Sub-Saharan Africa. Neither extension, additional investment, or any other action by the farmers was needed. Once released from the airplane, the wasps reproduced and dispersed themselves. But in most cases, technical solutions to pest problems do not have wings of their own and are not implemented that easily. The remainder of this brief focuses on cases where technical solutions alone are not sufficient and the collaboration of farmers is crucial for successful pest management.

FARMER COLLABORATION FOR PEST MANAGEMENT

Leaf-cutting ants are a serious problem for farmers in many parts of Latin America. These ants are capable of destroying an entire cassava plot or one or more fruit trees overnight. There are simple technical options for controlling the ants, such as the regular pumping of insecticide into the anthill. Ants, however, do not respect farm boundaries. Farmers who control anthills on their own fields might still face damage to their crops caused by ants coming from neighboring fields where no control measures are taken.

Actions by individual farmers acting alone in cases like these can also raise new problems. The extensive use of pesticides on some farms may drive pests to fields of others or cause the pests to develop localized resistance to pesticides.

Likewise, if farmers use pesticides that kill not only the pests but also their enemies, neighboring farmers who introduce or encourage the presence of predators may find that their predator populations never reach a viable size.

Often, the best results occur when the majority of farmers in an area adopt integrated pest management practices, such as combining occasional use of pesticides with crop rotation or intercropping of different crops or varieties. Convincing neighboring farmers to adopt such practices in a coordinated fashion is thus key to success. This need is especially great when the integrated approach involves allowing some crop losses to achieve greater overall profits, as well as to reduce environmental pollution and health hazards from heavy pesticide use.

In such cases, successful pest management has both a spatial and a temporal dimension. First, it depends upon being implemented in a coordinated fashion over a wide geographic area. Thus pest management is more effective if required institutions are in place to stimulate and facilitate coordinated or collective management efforts. Second, although in some cases a pest is controlled once and for all over a short time, in other cases pest management is a continuous effort that requires sustained collective action. This commitment in turn requires a certain degree of stability in the group undertaking the coordinated pest management. Under certain conditions secure property rights might contribute to ensure such stability, but they are no guarantee. Many other factors contribute to farmers' decisions about whether to continue farming in an area, such as the existence of alternative livelihood options in and outside the area, a sense of belonging to an area, and local cultural and social settings.

GAINING FARMERS' SUPPORT FOR COLLABORATION

Perhaps the biggest obstacle to coordinated pest management is the view of farmers as sovereign decisionmakers. In many places, farmers are reluctant to interfere with the farming practices of others because this action might be perceived as a reproach and thus endanger future relationships and perhaps block future favors. A key challenge therefore is to create institutions through which to encourage neighboring farmers to participate in coordinated pest management so that the individual farmer does not need to approach his or her neighbors.

It is essential that farmers jointly recognize the trans-boundary nature of pest management problems, because this recognition helps to legitimize the otherwise socially unacceptable interference with the farming practices of others. In the case of ant control in Colombia, a joint community map of the location of anthills and their potential radius of crop damage,

superimposed on a map of farm boundaries, provided an important illustration of the transboundary nature of the ant control problem. With the help of the map and the backing of external facilitators, farmers could calculate the average number of anthills affecting each plot and the number of anthills actually located on plots belonging to other farmers.

In many cases, external support is needed to help systematize the biophysical (such as ecological and entomological) observations and arguments upon which the need for coordinated pest management is based. Institutions such as farmer field schools or an agricultural extension service might be feasible options for providing this external support.

Another important element that helps persuade farmers to participate in coordinated pest management is the availability of low-cost, economically feasible technical options for control. Which options are considered low cost and economically feasible obviously depends upon the context—that is, the potential damage caused by the pest as well as the resources available to the individual farmer. Generally speaking, the more widespread and severe the damage caused by pest problems and the less demanding and costly the technical control option, the easier it will be to persuade farmers to participate in coordinated pest management.

Hence, in areas with no previous experience of coordinated pest management, it is wise to begin by embarking on pest management problems that

- are widespread (that is, they should affect the majority of farmers so that a large proportion of farmers will not decline to participate in the coordinated pest management effort);
- are amenable to low-cost management options so that the poorest farmers are not prevented from participating in the coordinated pest management effort; and
- can be dealt with effectively at a relatively limited spatial scale so that farmers do not become frustrated at having to coordinate their pest management efforts with distant and perhaps unknown farmers.

CONCLUSIONS

Because of the transboundary nature of many pest problems, technical solutions—whether based on the use of pesticides or on biological principles—are rarely sufficient. To be effective, such technical solutions need to be implemented in a coordinated fashion among farmers within a given area. Coordination, however, often represents a major challenge. Even within a limited geographical area it is likely that farmers are highly heterogeneous and that multifaceted and often unequal relationships exist among them.

Why is it advisable, in areas with no previous experience of coordinated pest management, to start by embarking on pest management problems that are widespread, have low-cost solutions, and are of limited spatial scale? First, meeting these requirements will increase the likelihood that a sufficient proportion of farmers within an area will be interested and able to participate in the coordinated pest management options. Second, under these conditions it is easier for farmers to mutually monitor compliance with agreed management practices. Wide and consistent compliance will, in turn, facilitate the gradual development of trust among neighboring farmers, which is so important when, as in integrated pest management, short-term individual gains must be balanced against longer-term collective interests.

The implications are that extension approaches such as farmer field schools should (1) promote an understanding of the spatial dimensions of pest ecology and (2) provide communication techniques that will enable groups of farmers to approach neighboring farmers to invite them to take part in coordinated pest management. ■

For further reading see R. Meinzen-Dick, A. Knox, F. Place, and B. Swallow, eds., *Innovation in Natural Resource Management: The Role of Property Rights and Collective Action in Developing Countries* (Baltimore: Johns Hopkins University Press, 2002), especially pp. 257–271, “Collective Action in Ant Control,” by H. M. Ravnborg, A. M. de la Cruz, M. P. Guerrero, and O. Westermann; J. Pretty, *Regenerating Agriculture: Policies and Practice for Sustainability and Self-Reliance* (London: Earthscan, 1995).

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